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UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD, DANBURY, CT 06817
Corporate Health, Safety and Environmental Affairs Department

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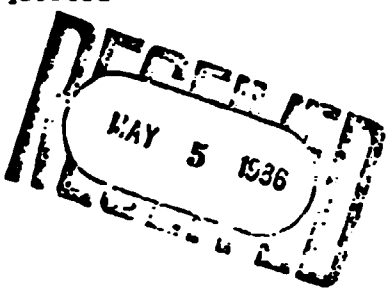

U.S. Environmental Protection Agency
TSCA 8D1
P.O. Box 2060
Rockville, Maryland 20852

Subject: Union Carbide Corp. TSCA Sec. 8(d)
Report, 40 CFR 716.6 & 716.7

Sirs:

With respect to:

40 CFR Secs. 716.6 & 716.7;
Fed. Reg., Vol. 47, pp. 38791 and ff., Sept. 2, 1982;
Amended Jan. 22, 1986,, 716.11(e) and 716.17(a)(13)
and (c)(1).

Union Carbide Corp. herewith submits the following studies (attached) in response to the above-identified amendment to the state rule. These studies are on the following chemicals:

2-Butenal, CAS No. 4170-90-3;
Hydroperoxide, 1-methyl-1-phenylethyl-, CAS No. 80-15-9;
1-Propaneamine, N-propyl-, CAS No. 142-84-7;
1-Propanol, 2-methyl-, CAS No. 78-83-1.

I. 2-Butenal.

I.a. Crotonaldehyde, Treatment of Accidental Spills, Union Carbide Project Report File No. 16663, Jan. 7, 1972, B. Pesetsky. 8782164 43

I.b. Range Finding Tests on Crotonaldehyde, Mellon Institute of Industrial Research Special Report 5-40, March 11, 1942, C.P. Carpenter. 8782164 44

I.c. Water Quality Development, Biomass Toxicity Studies, Union Carbide Project Report File No. 25171, June 13, 1978, G.T. Waggy et al. 8782164 45

I.d. Environmental Impact Product Analysis, Acute Aquatic Toxicity Testing, Union Carbide Project Report File No. 19133, Jan. 25, 1974, G.T. Waggy et al. 8782164 46

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I.e. Environmental Impact Analysis, Product Biodegradability Testing, Union Carbide Project Report File No. 19751, Aug. 12, 1974, G.T. Waggy et al.

I.f. Mellon Institute of Industrial Research, Progress Report No. 11-52, March 29, 1948, H.P. Smyth, Jr., et al. 8782164478

I.g. Mellon Institute of industrial Research, Progress Report No. 5-21, Jan. 31, 1942, H.P. Smyth, Jr., et al. 8782164479

I.h. Mellon Institute of Industrial Research, Progress Report No. 4-87, Oct. 6, 1941, H.P. Smyth, Jr., et al. 8782164580

II. Hydroperoxide, 1-Methyl-1-phenylethyl-

II.a. Cumene Hydroperoxide, Range Finding Toxicity Studies, Chemical Hygiene Fellowship Special Report 38-49, May 2, 1975, R.C. Myers et al. 8782164581

III. 1-Propanamine, N-propyl-

III.a. Range Finding Tests on Di-n-propylamine, Mellon Institute of Industrial Research, Report No. 21-11, Dec. 31, 1957, C.P. Carpenter. 8782164582

III.b. Same report as in item I.d. (above), entry in Table I for "Dipropylamine". 8782164466

III.c. Same report as in item I.e. (above), entry in Table I for "Dipropylamine". 8782164477

See also report I.d., Table V.

See also report I.e., Table I and Table II.

IV. 1-Propanol, 2-methyl-

IV.a. Range Finding Tests on Isobutanol, Mellon Institute of Industrial Research, Report No. 16-100, Nov. 17, 1953, C.P. Carpenter. 8782164583

IV.b. Quantitative Aspects of Chemical Burns of the Eye, Mellon Institute of Industrial Research Report No. 9-11, Jan. 21, 1946, H.F. Smyth, Jr. 8782164584

IV.c. Mellon Institute of Industrial Research, Progress Report No. 14-78, Nov. 23, 1951, H.F. Smyth, Jr., et al. 8782164585

See also report I.d., Table IV and Table VII.

See also report I.e., Table I and Table II.

To the best of our knowledge, the above represents all the studies on the chemicals currently subject to reporting under the above-identified rule.

Should any additional studies come to our attention as the result of our file searches, we will advise the Environmental Protection Agency immediately. Where in some reports (attached and captioned above) an entry regarding confidentiality appears on the first page, that statement was entered solely for guidance of internal and external dissemination at the time of issuance of the report; Union Carbide asserts no claim of confidentiality for any of the information conveyed in this letter and in the attached reports. We hereby advise the Environmental Protection Agency, however, that the studies that were sponsored by Union Carbide Corporation are the property of Union Carbide for publication purposes.

Any questions regarding this report, or the testing or results therefrom, should be addressed through my office.

Very truly yours,

D L Heywood

D.L. Heywood
Assistant Director
Product Safety
203 794-5224

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MELLON INSTITUTE OF INDUSTRIAL RESEARCH

UNIVERSITY OF PITTSBURGH

SPECIAL REPORT

on

RANGE FINDING TESTS ON CROTONALDEHYDE

Number copies made 6
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Date of mailing 3-16-42
Addressed to 1- Dr. U. S. ..., 1- Mr. R. K. ...

Carbide and Carbon Chemicals Corporation Industrial Fellowship No. 274-5

The sample of crotonaldehyde used in these tests was the commercial grade procured from South Charleston 8-27-41. Tables 5-82, 5-83, 5-84, and 5-85 give details of some of the animals used.

Single Dose by Mouth

Crotonaldehyde given in single doses by mouth to rats as a 1.0% solution made up in 1.0% "Tergitol" 7 resulted in an LD_{50} of approximately 0.3 gm./kg. Death following a dosage of 1.0 gm./kg. occurred within 10 minutes. Animals were in pain and jumped about until death ensued. The liver, stomach, and intestine were congested. The kidney was pale and the peritoneal fluid excessive.

Single Dose by Skin Absorption (4 Day Contact)

Poultices of undiluted material held for 4 days upon guinea pig skin resulted in a mortality of 8% at 0.01 gm./kg. and 100% mortality at 0.1 gm./kg. The LD_{50} is estimated as approximately 0.03 gm./kg. The skin was tanned a dark brown and slight necrosis resulted.

Single Dose by Skin Absorption (1 Day Contact)

When poultices were removed from guinea pigs after a 1 day contact period instead of the usual 4 days, the estimated LD_{50} is 0.3 gm./kg. The skin was brown and slightly tough indicating a tanning action. In some instances when 1.0 gm./kg. was applied there was a subcutaneous gelatinous exudate and evidence of damage to internal organs.

Single Dose by Skin Absorption (2 Hour Contact)

Poultices were applied for 2 hours to the guinea pig and then removed and the site of application washed with acetone. A dosage of 0.3 gm./kg. is the approximate LD_{50}. The skin was tanned at the site of application. The similarity of results, in this short contact period and, the 1 day application period, indicates the rapidity of skin penetration and the high toxicity by this route.

A

Vapor Inhalation

Crotonaldehyde vapors, substantially saturated at room temperature, did not kill any of 4 rats after an exposure of 1 minute. Ten minutes exposure killed all of 4 rats on the day the exposure was made. Three minutes is the estimated time to kill 50% of the rats exposed. This work was done previous to the latest standardization of our saturated vapor technique and animals were held only for a 7 day observation period instead of the usual 14 days.

Local Action

In the rabbit eye, 0.001 ml. produced very severe necrosis, and on the rabbit belly the undiluted material tanned the skin within 15 minutes without other damage visible to the naked eye. Crotonaldehyde is a sensitizing agent when repeated applications to human skin are made, but single applications of .01 ml. on 5 subjects produced only a transient erythema. Repeated applications on one individual resulted in a vesicular type of response which subsided after cessation of application but which resulted in an exacerbation of papules without apparent cause 3 months after the last application.

Summary

In single doses by mouth in a 1.0% solution Crotonaldehyde has an LD_{50} of approximately 0.3 gm./kg. for rats, which places it in our grade 7 comparable to ethylene oxide and propylene chlorhydrin.

By skin absorption, crotonaldehyde is about half as toxic as ethylene imine and twice as toxic as ethylene chlorhydrin. The general fear of the blisters it has produced in the plant and the pain caused soon after contact are protections against sufficient contact for internal injury. It rapidly penetrates the intact skin tanning it in all instances and often causing necrosis.

Single exposures to saturated vapors are very hazardous. It has about the same lethal effect as acrylonitrile and chlorpicrin, but more warning irritation than the former and a lower vapor pressure.

Extreme caution should be used to guard against contact with the eyes or skin, since it causes necrosis of the cornea in 0.001 ml. amounts and penetrates the skin rapidly. It is definitely a sensitizing agent.

Charles P. Carpenter

Charles P. Carpenter
INDUSTRIAL FELLOW

March 12, 1942 - abc

Table 5-82

Crotonaldehyde

Single Doses to Male Albino Rats by Mouth Fed by Stomach Tube as Dilution in Water + "Tergitol" 7, 1 ml. = 0.01 gm.

Rat No.	Date Dosed	Grams Wt.	Weight Change in 14 Days	Dosage; Grams per Kilo	Dose in Grams	Dose in ml. of Dilution	Days to Death
18,168	2-17-42	108	-	1.00	.108	10.8	0
18,169	2-17-42	105	-	1.00	.105	10.5	0
18,170	2-17-42	106	-	1.00	.106	10.6	0
18,171	2-17-42	114	-	1.00	.114	11.4	0
18,172	2-17-42	94	-	1.00	.094	9.4	0
18,173	2-17-42	106	-	1.00	.106	10.6	0
18,176	2-17-42	107	+ 31	.10	.0107	1.1	-
18,177	2-17-42	109	+ 39	.10	.0109	1.1	-
18,179	2-17-42	106	+ 62	.10	.0106	1.1	-
18,180	2-17-42	115	+ 49	.10	.0115	1.2	-
18,181	2-17-42	111	+ 49	.10	.0111	1.1	-
18,182	2-17-42	102	+ 38	.10	.0102	1.0	-

Table 5-B3

Crotonaldehyde (4 days)
Single Doses to Guinea Pigs by Skin Absorption Administered
Undiluted on Cotton Poultices

Pig No.	Sex	Date Clipped	Date Applied	Date Removed	Gm. Wt.	Weight Change in 14 Days	Dosage; Grams per Kilo	Dose in ml.	Days to Death
16,[illegible]	M	9-[illegible]-41	9-24-41	-	264	-	1.0	.264	1
16,[illegible]	M	9-23-41	9-24-41	-	249	-	1.0	.249	1
16,[illegible]	M	9-[illegible]-41	9-24-41	-	276	-	1.0	.276	1
16,[illegible]	F	9-[illegible]-41	9-24-41	-	259	-	1.0	.259	1
16,[illegible]	F	9-[illegible]-41	9-24-41	-	261	-	1.0	.261	1
16,[illegible]	F	9-[illegible]-41	9-24-41	-	262	-	1.0	.262	1
16,236	M	10-10-41	10-10-41	-	289	-	0.1	.029	1
16,239	M	10-10-41	10-10-41	-	272	-	0.1	.027	1
16,241	M	10-10-41	10-10-41	-	304	-	0.1	.030	1
16,246	M	10-10-41	10-10-41	-	272	-	0.1	.027	1
16,243	F	10-10-41	10-10-41	-	309	-	0.1	.031	1
16,245	F	10-10-41	10-10-41	-	284	-	0.1	.028	1
16,649	F	10-31-41	10-31-41	-	264	-	0.01	.003	4
16,496	M	10-31-41	10-[illegible]-41	10-[illegible]6-41	266	+ 26	0.01	.003	-
16,497	M	10-31-41	10-[illegible]-41	10-[illegible]6-41	250	+ 49	0.01	.002	-
16,498	M	10-31-41	10-22-41	10-[illegible]6-41	265	+ 73	0.01	.003	-
16,461	M	10-31-41	10-22-41	10-[illegible]6-41	264	+ 64	0.01	.003	-
16,467	M	10-[illegible]1-41	10-[illegible]-41	10-[illegible]6-41	262	+ 88	0.01	.003	-
16,667	M	10-31-41	10-31-41	11-4-41	251	+ 47	0.01	.002	-
16,675	M	10-31-41	10-31-41	11-4-41	336	- 6	0.01	.003	-
16,500	F	10-31-41	10-[illegible]-41	10-[illegible]6-41	249	+ 41	0.01	.002	-
16,637	F	10-31-41	10-31-41	11-4-41	298	+ 4	0.01	.003	-
16,660	F	10-31-41	10-31-41	11-4-41	264	+ 14	0.01	.003	-
16,665	F	10-31-41	10-31-41	11-4-41	242	+ 33	0.01	.002	-

D

Table 5-84

Crotonaldehyde (1 day)
Single Doses to Guinea Pigs by Skin Absorption
Administered Undiluted on Cotton Poultices

Pig No.	Sex	1941 Date Clipped	1941 Date Applied	1941 Date Removed	Gm. Wt.	Weight Change in 14 Days	Dosage; Grams per Kilo	Dose in ml.	Days to Death
16,225	M	10-10	10-10	-	260	-	1.0	.260	1
16,226	M	10-10	10-10	-	286	-	1.0	.286	1
16,229	M	10-10	10-10	-	291	-	1.0	.291	1
16,232	M	10-10	10-10	-	302	-	1.0	.302	1
16,221	F	10-10	10-10	-	222	-	1.0	.222	1
16,224	F	10-10	10-10	-	309	-	1.0	.309	1
16,633	M	10-28	10-28	10-29	301	+31	0.1	.030	-
16,492	F	10-28	10-28	10-29	270	+62	0.1	.027	-
16,495	F	10-28	10-28	10-29	245	+41	0.1	.024	-
16,629	F	10-28	10-28	10-29	298	+26	0.1	.030	-
16,630	F	10-28	10-28	10-29	254	+15	0.1	.025	-
16,634	F	10-28	10-28	10-29	294	+64	0.1	.029	-

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Table 5-85

Crotonaldehyde
Single Doses to Guinea Pigs by Skin Absorption
Administered Undiluted on Cotton Poultices
and Washed with Acetone after 2 hour Contact Period

Pig No.	Sex	1941 Date Clipped	1941 Date Applied	Date Removed	Gm. Wt.	Weight Change in 14 Days	Dosage Grams per Kilo	Dose in ml.	Days to Death
16,308	M	10-10	10-10	2 hrs.	302	-	1.0	.302	1
16,304	F	10-10	10-10	2 hrs.	280	-	1.0	.280	1
16,305	F	10-10	10-10	2 hrs.	283	-	1.0	.283	1
16,306	F	10-10	10-10	2 hrs.	304	-	1.0	.304	1
16,307	F	10-10	10-10	2 hrs.	307	-	1.0	.307	1
16,309	F	10-10	10-10	2 hrs.	290	-	1.0	.290	1
16,474	M	10-23	10-23	2 hrs.	292	+60	0.1	.029	-
16,494	M	10-23	10-23	2 hrs.	248	+51	0.1	.025	-
16,504	M	10-23	10-23	2 hrs.	289	+95	0.1	.029	-
16,473	F	10-23	10-23	2 hrs.	228	+50	0.1	.028	-
16,493	F	10-23	10-23	2 hrs.	245	+39	0.1	.024	-
16,499	F	10-23	10-23	2 hrs.	250	+55	0.1	.025	-

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